Reg. No.												

SAI RAM INSTITUTE OF TECHNOLOGY

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CONTINUOUS ASSESSMENT TEST - II

Question Paper Code	24NU12F031

Course Code - Name : 24BSCY101 – Engineering Chemistry

Degree & Program : B.E / B.TECH (COMMON TO ALL EXCEPT CSBS)

Date of Exam : 27.11.2024 Year / Semester : I / I

Duration : 1 ½ Hours Max. Marks : 50

Answer ALL Questions

	PART – A (10× 1 = 10 Marks)	K-Level	CO
1	The Stark-Einstein Law of photochemistry states that: A) Each photon absorbed by a molecule result in one molecular event. B) For every absorbed photon, there are multiple molecular events. C) Photochemical reactions can occur without light absorption. D) Quantum yield is inversely proportional to light intensity.	K1	CO3
2	Which of the following is an example of a photochemical reaction in nature? A) Combustion of fossil fuels B) Photosynthesis in plants C) Oxidation of metals D) Decomposition of water by heat	K1	CO3
3	Chemiluminescence is the emission of light as a result of: A) A chemical reaction. B) The absorption of photons by a molecule. C) The recombination of ions in a gas phase. D) The transition of electrons from an excited state to a lower energy state	K1	CO3
4	Which of the following components is commonly used as a light source in IR spectroscopy? A) Xenon lamp B) Tungsten filament lamp C) Nernst glower D) Deuterium lamp	K1	CO3
5	In IR spectroscopy, a bond will absorb infrared radiation if the vibration involves a change in:	K1	CO3

A) Electron density. B) The dipole moment of the molecule.

C) The molecular mass. D) The bond length.

6	Intensive property in the following is	K1	CO4
	A) Internal energy B) Enthalpy C) Free energy D) Concentration		
7	For the cyclic process	K1	CO4
	A) $dE \neq 0, dH = 0$ B) $dE > 0, dH = 0$ C) $dE = 0, dH \neq 0$ D) $dE = 0, dH = 0$		
8	What is an "isobaric process"?	K1	CO4
	A) A process in which temperature remains constant.		
	B) A process in which volume remains constant.		
	C) A process in which no heat is transferred.		
	D) A process in which pressure remains constant.		
9	The change in entropy for reversible process,	K1	CO4
	A) $\Delta S_{Total} = 0$ B) $\Delta S_{Total} < 0$ C) $\Delta S_{Total} > 0$ D) $\Delta S_{Total} = 1$		
10	At high temperature, if ΔH = -ve and ΔS = -ve then	K1	CO4
	A) The reaction is spontaneous B) The reaction is non-spontaneous		
	C) The reaction is at equilibrium D) Heat of the system is constant		

PART – B (10 × 2 = 20 Marks)

		K-Level	CO
11	State the Beer-Lambert law?	K1	CO3
12	Define the term: Bathochromic and hypsochromic Shift?	K1	CO3
13	Explain the role of a photosensitizer in photochemical reactions.	K1	CO3
14	What is finger print region? Mention its important uses?	K1	CO3
15	Calculate the fundamental vibrational mode of i) CH_4 ii) CO_2	K2	CO3
16	What is isothermal and adiabatic process?	K1	CO4
17	What are intensive and extensive properties. Give an example.	K1	CO4
18	Define the Kelvin statement of II law of thermodynamics.	K1	CO4
19	What is Clausius inequality?	K1	CO4
20	Write the significance of Gibb's Helmholtz equation.	K1	CO4

PART – C (2 × 10 = 20 Marks)

			Mark Split up	K-Level	CO
21.	a)	What is Jablonski diagram? Using this explain the mechanism of radiative and non-radiative transitions involved.	10	K2	CO3
		(Or)			
	b)	Explain the main features of working of UV-visible spectrometer with a neat block diagram	10	K2	CO3

22.	a) Derive all the four Maxwell relations of thermodynamic quantities.	10	K3	CO4
	(Or)			
	b) Derive an expression of Van't Hoff isotherm.	10	K3	CO4

Course Outcomes

After successful completion of the course, students will be able to

CO1	Explain the importance of polymers in science and technology, describe their roles in different applications and discuss their impacts on modern advancements. (K3)
CO2	Recognize the basic principles of electrochemistry and describe their application in battery technologies. (K3)
CO3	Apply the concepts of key photophysical and photochemical processes, as well as spectroscopy, to develop and optimize various applications. (K3)
CO4	Describe the principles of the second law of thermodynamics and its derivations to analyze engineering applications across all disciplines. (K3)
CO5	Categorize the chemistry of fuels and combustion and their applications at various levels. (K3)
CO6	Demonstrate the knowledge of nanomaterials, including their properties, behavior, interactions and applications across various disciplines of science and technology. (K3)

Distribution of COs (Percentage wise)						
CO No.	**CO1**	**CO2**	**CO3**	**CO4**	**CO5**	**CO6**
%	----	----	**50**	**50**	----	----